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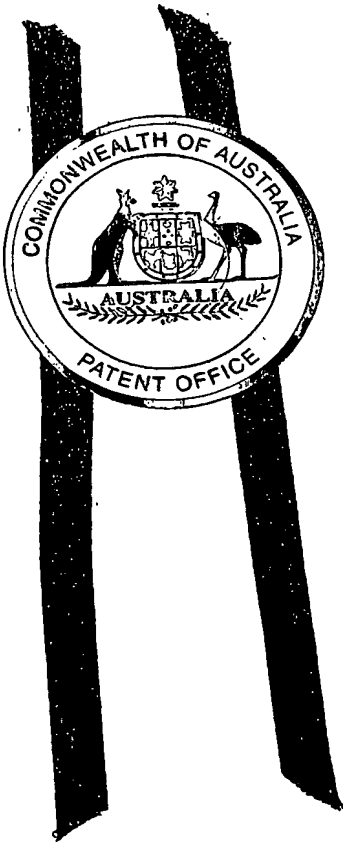
Patent Office
Canberra

I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003902763 for a patent by OWEN KEITH HUTCHISON as filed on 04 June 2003.

I further certify that the above application is now proceeding in the name of INNOVATIVE MOTORCYCLE TECHNOLOGY PTY. LTD pursuant to the provisions of Section 113 of the Patents Act 1990.

WITNESS my hand this
Eleventh day of August 2003

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES



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**Australia
Patents Act 1990**

Provisional Specification

Provisional Patent

**Combined Clutch and Brake Lever
with Foot Pedal**

The invention described in the following statement:

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Combined Clutch and Brake Lever with Foot Pedal

Description

This invention is intended to improve the controllability of vehicles fitted with handlebar-mounted controls and a foot operated brake pedal by providing the operator with a mechanism that integrates the control of clutch and rear brake. This hand control actuates the clutch and rear brake in sequence and is based on the premises that

- consolidating the rear brake and clutch controls into a single hand control makes it simpler to coordinate operations that utilise both controls,
- in the operation of a handlebar fitted motor vehicle the operator generally always has their hands on the handlebar whereas their feet are often not in a position where they are able to operate a foot pedal,
- and if the brake locks up the rear wheel the engine may stall unless the clutch is disengaged..

However, the current practise is for operators to use their right foot to control the rear brake and they may be uncomfortable if that brake control was not longer present on the vehicle.

This invention caters for that situation by including a foot pedal that actuates the rear brake. The anti-stall feature is also provided for as the mechanism also disengages the clutch after the foot pedal actuates the rear brake.

To assist in the understanding of the invention please refer to the following four figures which are:

- Figure 1 shows a partial cross section of the handlebar mounted module, this figure omits mounting brackets to improve clarity
- Figure 2 shows a partial cross section of the foot pedal
- Figure 3 show a detailed partial cross section of the clutch rocker arm assembly
- Figure 4 shows a partial cross section of the ball spring detent unit

A detailed description of the operation of the invention is described by the following:-

Pulling the operator's lever (1) towards the handle bar (6) rotates the cam for clutch actuation (4) around the main pivot (11). The cam then pushes against the cam follower bearing (3) which via the cam follower rocker arm (8) moves the clutch master cylinder piston (18) thus operating the clutch.

Figure three shows the clutch rocker arm and cam follower bearing arrangement in the more detail. Once the clutch has been disengaged the cam for clutch operation is profiled so as further travel of the operators lever (1) causes very little or no further displacement of the clutch master cylinder piston.

This effectively means that from the point at which the clutch is disengaged for example roughly half way though the operators levers (1) travel of the operators lever (1) towards the handle bars (6) requires very little effort. During this initial travel of

the operators lever (1) that operates the clutch the freeplay in the brake master cylinder is taken up.

This freeplay in the brake master cylinder is caused by the fact the at the return to the reservoir port must be closed before any pressure can build up in the brake system. As the operators lever (1) is pulled towards the handle bars (6) a light spring (17) causes the brake actuation arm (2) to rotate around the main pivot (11) until the ball, spring, detent system shown in detail in fig. 4 stops further rotation of the brake actuation arm (2). The brake actuation arm (2) moves the brake master cylinders (23) piston via the brake pushrod (13).

Note that the brake pushrod is connected to the brake actuation arm (2) via a pivot (12) and that this brake pushrod (13) is also pivoted at the point at which it is connected to the brake master cylinders piston. It is envisaged that this pivot (14) is in fact a spherical rod end in order to prevent excessive side loading on the brake master cylinder piston. Also note that the brake master cylinder piston is positively connected to the brake activation arm (2) via the brake pushrod (13) and its two pivots (12) and (14). That is the brake activation arm (2) has the ability to both push and pull the brake master cylinders piston.

Once the ball spring detent has locked the brake actuation arm further travel of lever (1) towards the handlebars (6) does not move the brake actuation arm until the brake initiation adjuster contacts the brake actuation arm (2) at which point any further travel of the operators lever (1) towards the handlebars (6) will operate the rear brake.

If the operators lever (1) is released the brake system pressure returns the brake master cylinder piston most of the way back. The brake master cylinder piston is pulled over the ball spring detent and back to an open to reservoir position by the brake actuation arm return spring (5).

Note there is no return spring shown in the brake master cylinder but in some applications a return spring may be desirable. Also note that the return of the operators lever (1) to its position furthest from the handlebars (6) is facilitated by the clutch master cylinders piston return spring (2) and that the profile of the cam (4) is tailored to ensure there is sufficient force to return the operators lever (1) to its furthest away from the handlebar (6) position which in turn via the brake actuation arm return spring returns the brake master cylinder piston to the "open port to reservoir position".

If the foot brake pedal (24) is depressed, it via the pedal operation cable (7) causes the brake actuation arm (2) to rotate around the main pivot (11) thus operating the rear brake. Also at a point determined by the anti-stall adjuster (10) the operators lever (1) is caused to rotate around the main pivot (11) which operates the clutch. The purpose of this clutch operation is to help prevent the stalling of the motor due to rear brake lock.

For the purpose of clarity the bracket is not shown in the drawings however the following items can be assumed to be located by the handlebars by the missing bracket

1. the main pivot (11)
2. the clutch rocker arm pivot (16)
3. the ball spring detent unit (27)

4. the pedal operation cable (7) outer
5. the clutch master cylinder (position adjustable)
6. the brake master cylinder (position adjustable)

Note: The rotating spindle (28) situated on the operators lever (1) is to reduce friction caused by the operators fingers rolling over the lever as it is operated.

Note the purpose of the ball, spring, detent arrangement shown in figure 4 is to provide tactile indication of the initiation of the brake function but note the invention does not limit itself to this particular form of providing tactile indication.

Although the following features have been shown in this example they are not essential to the core functionality of invention but instead are minor improvements

- Spindle (28)
- Detent unit (27)
- Positive return of the hydraulic cylinder piston
- Cam operation of the clutch
- Brake actuation arm return spring
- Brake free lay take-up spring
- Anti-stall feature via foot pedal operation (10 and associated arm)

It will be realised that the combined clutch and brake lever with foot pedal according to this invention is not restricted to the use of hydraulic cylinders or cables as shown in the example but may use other suitable forms of operating the clutch or brake, for example; pneumatic, electric or any other means by which the clutch or brake can be effectively activated. It will be further realised the leverage ratios and hydraulic cylinder sizes show are for example only and an individual vehicle may require re-positioning of pivot points, changing of leverage ratios or cylinder sizes or the use of power assistance to increase efficiency.

Owen Hutchinson

22nd May, 2003

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Combined Clutch and Brake Lever with Foot Pedal

Abstract

A foot pedal and handle bar mounted single lever that controls the clutch and brake of a motor vehicle.

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Drawing References

1. Operators Lever
2. Brake Actuation Arm
3. Cam follower bearing
4. Cam for clutch operation
5. Brake actuation arm return spring
6. Handle bar
7. Pedal operation cable
8. Cam follower rocker arm for clutch
9. brake initiation adjuster
10. anti-stall adjuster
11. main pivot
12. brake operation arm to brake pushrod pivot
13. brake pushrod
14. brake pushrod to brake piston pivot
15. detent for tactile feel of brake initiation
16. pivot point for clutch rocker arm
17. spring for brake free play take up
18. clutch master cylinder piston
19. clutch master cylinder
20. clutch master cylinder piston return spring
21. clutch master cylinder hydraulic outlet
22. brake master cylinder hydraulic outlet
23. brake master cylinder
24. Foot brake pedal
25. Foot pedal cable adjuster
26. brake pedal pivot
27. ball spring detent unit
28. rotating spindle

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FIG. 1

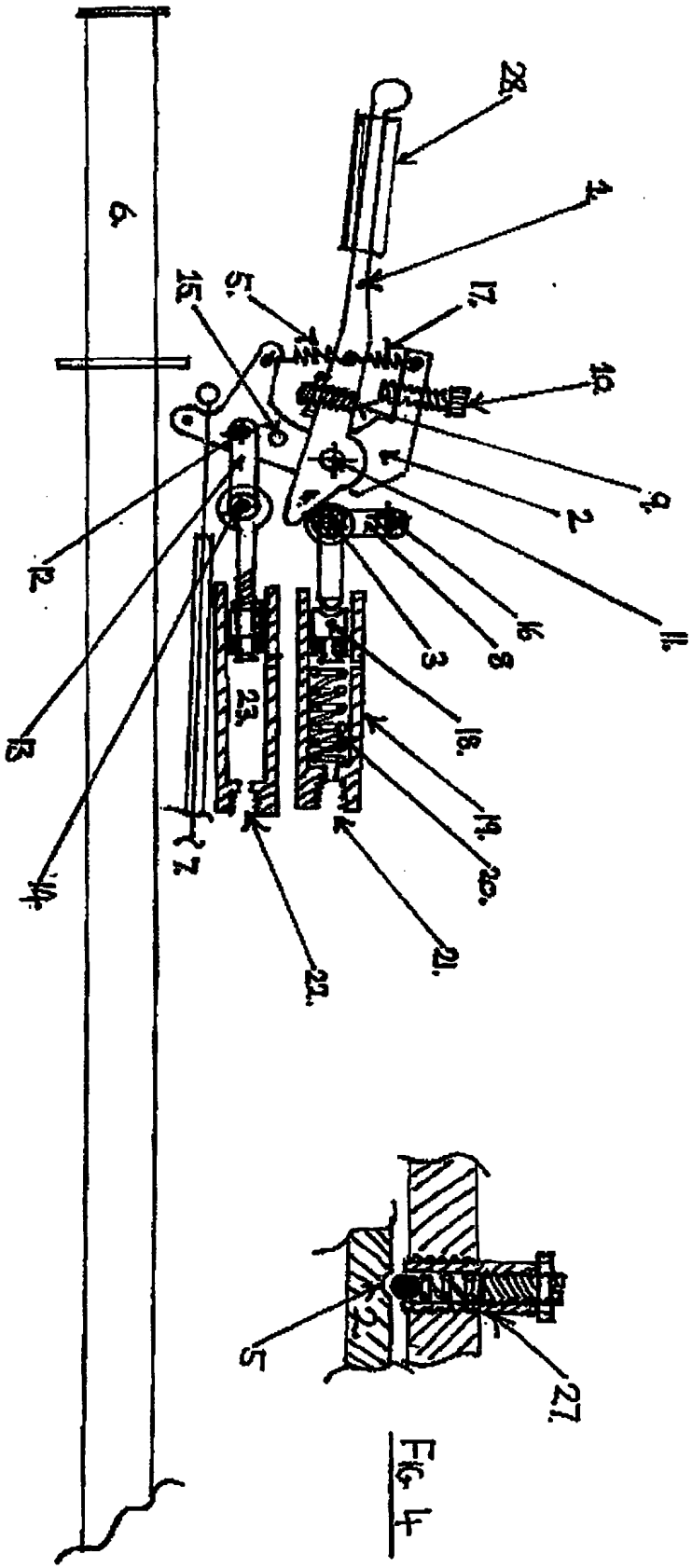


FIG. 3

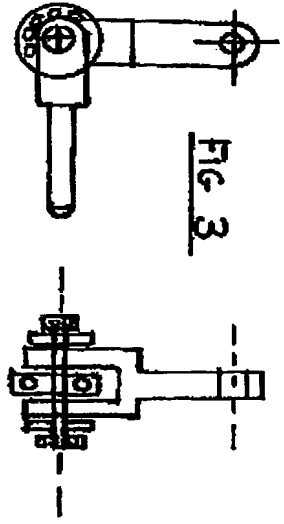


FIG. 2

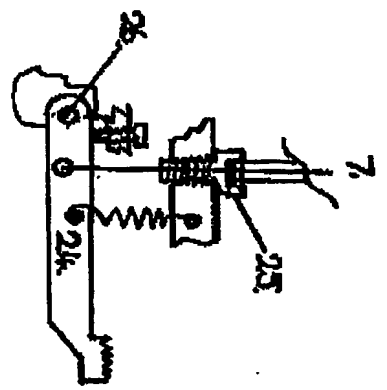
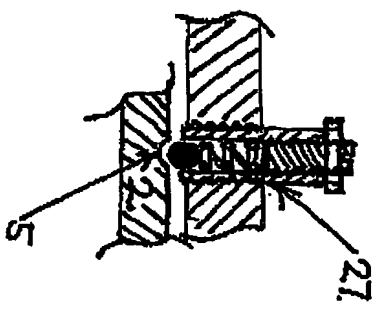


FIG. 4



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